Troubleshooting IBM® Lotus® Domino® 8 mail routing issues

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Abstract: This white paper demonstrates how to identify and resolve IBM® Lotus® Domino® 8 mail routing problems. By explaining how and which debug to use, and how to analyze the debug output, it is intended to help customers debug mail-routing issues on their own. Support Engineers can also benefit from this paper by enhancing their understanding of the debug outputs and by using it as a "cheat sheet" in identifying and resolving common mail-routing issues.

Contents

1 Introduction

IBM Lotus Domino is a widely used messaging system, and one of the most commonly reported problems is around mail routing. Often times, issues are simple and can resolve on their own (for example, network links, DNS unavailability); however, there are certain scenarios in which it's difficult to identify the root cause of the issue.

During the troubleshooting of such issues, a technical support engineer frequently asks a customer to enable certain debugs. So you may wonder: What information is captured using debug parameters? And how does IBM interpret the debug to identify the issue?

In this paper we explain the algorithmic approach to troubleshooting mail-routing-related issues by demonstrating how to troubleshoot the following:

- Internal mail routing not working
- Mail is not routing to the Internet while internal mail works fine.
- Problems in inbound SMTP mail
- Problems receiving mail via POP3 or IMAP
- Syntax of your Internet address is incorrect; when Internet users try to reply to your mail, they get a Delivery Failure Report (DFR).
- Duplicate messages are received by a Notes mail file.
- Mail is getting delivered to the wrong person.

By learning these techniques, customers should be better able to troubleshoot the above issues on their own.

2 Overview of IBM Lotus Notes® mail routing

Let's begin by reviewing the basic steps of how mail routes in a Lotus Domino mail system:

1. Using a mail client, you create and address a mail message to a recipient.
2. You send the message, and your mail client uses either:

- Lotus Notes (NRPC) protocols to deposit the message into the MAIL.BOX database on your Domino mail server,

- SMTP to send the message to your Domino mail server, which must be running the SMTP listener task. The SMTP listener task deposits the message into MAIL.BOX (Lotus Notes, IMAP clients, POP3 clients), or

- HTTP to send the message to your Domino mail server, which must be running the HTTP task. The HTTP task deposits the message into MAIL.BOX (Web clients, iNotes, DWA).

3. The router finds the message in MAIL.BOX and determines where to send it for each recipient. The router checks its routing table to calculate the next "hop" for the message on the path to its recipients and determines the appropriate protocol—either SMTP or Notes routing (NRPC)—with which to transfer the message:

    - For SMTP routing, the router connects to the destination server—the recipient's mail server, a relay host, a smart host, or one of the servers in the recipient's Internet domain—and transfers the message.

    - For Notes routing (NRPC), the router moves the message to the MAIL.BOX database on the server that is the next hop in the path to the recipient's mail server. The router on that server transfers the message to the next hop, until the message is deposited in the MAIL.BOX database on the recipient's home server.

4. The router on the recipient's server finds the message (in MAIL.BOX on a Domino server) and delivers it to the recipient's mail file.

5. Using a mail client, you retrieve the message from the mail file. Depending on the type of mail client, one of the following protocols is used: NRPC, IMAP, POP3, or HTTP.

3 How mail routing works

By default, Lotus Domino uses NRPC (also called Lotus Notes routing, or the Notes routing protocol) to transfer mail between servers. Notes routing uses information in the Domino Directory to determine where to send mail addressed to a given user, moving mail from the sender's mail server to the recipient's mail server.

The router for the sender's server determines the next server to which to move the message, in other words, the next "hop" on the path to the message's destination. Each server uses its routing table to calculate the next hop along the route to the destination server. When the message reaches the destination server, the router delivers it to the recipient's mail file.

3.1 How Notes routing moves a message

When you send mail to a recipient with a Notes address—for example, Jane Doe/Acme—the router picks up a message in MAIL.BOX to determine where to direct it. The router first looks in the Domino Directory for a Person document for the recipient, Jane Doe/Acme.

The Person document contains the name of Jane Doe's mail server. From this information the router uses its knowledge of the network (that is, the routing table) to determine the next stop for the message. How the Router dispatches the message depends on where the recipient's mail file is located, either on:

- the same server,
- a different server in the same Notes named network (NNN),
- a server in a different Notes named network within the local Domino domain, or
- a server in an external Domino domain

Moving a message to a recipient on the same server
If, after checking the recipient's Person document, the router determines that the recipient's mail server is the same as the sender's server, it delivers the message to the recipient's mail file.

Moving a message to a recipient on another server within a NNN
If the sender and recipient don't share a mail server, the router checks the Domino Directory to determine whether the servers are in the same Domino domain. If the Server document for the destination server is found within the Domino Directory, the router checks that document to determine the network information for the server.

On the Ports, Notes Network Ports, tab of the Server document, the server is assigned to one or more NNNs. A NNN is a group of servers in a given Domino domain that share a common protocol and are connected by a LAN or modem connections.

NOTE: Servers within the same domain may or may not be in the same NNN, while servers that share a NNN are always in the same Domino domain.

If the two servers share a NNN, the router immediately routes the message from the MAIL.BOX file on the sender's server to the MAIL.BOX file on the recipient's server. The router on the recipient's server then delivers the message to the recipient's mail file. Because mail routes automatically within a NNN, you don't need to create any additional connections or documents.

Moving a message to a recipient in a different NNN within the same Domino domain
If the sender's and recipient's mail servers are in the same Domino domain but don't share either a mail server or a NNN, for transfer to succeed there must be some connection between the two networks. You can make a connection between NNNs by using either:

- a "bridge" server that is a member of multiple NNNs
- a Connection document

When a Connection document provides the information for routing mail between NNNs, the source and destination networks can be in different Domino domains. The document contains all of the information the router needs to locate the destination network.

4 Overview of SMTP mail routing

By default, Lotus Domino uses the Notes routing protocol to transfer mail between servers, but you can configure Domino to use SMTP to route mail instead of, or in addition to, using Notes routing.

Message transfer over SMTP routing is performed as a point-to-point exchange between two servers. The sending SMTP server contacts the receiving SMTP server directly and establishes a two-way transmission channel with it. To send a message over SMTP:

1. The sending server checks the recipient's address, which is in the format *localpart@domain*, and looks up the domain in the Domain Name System (DNS).

2. DNS returns the Mail Exchanger (MX) record for the domain, indicating the IP address of the servers in the domain that accept mail over SMTP.

3. The sending server connects to the destination server over TCP/IP, establishes an SMTP connection on port 25, transfers the message, and closes the connection.

4.1 Enabling SMTP on a Domino server

Lotus Domino supports sending and receiving mail over SMTP by means of the SMTP listener task and SMTP router, respectively, each of which you enable separately.

The SMTP listener task handles incoming SMTP connections and delivers messages received over those connections to MAIL.BOX. It does not handle subsequent delivery or transfer of those messages. You configure the SMTP listener task for receiving mail on the Basics tab of the Server document (see figure 1).

Figure 1. Basics tab of Server document

The router task for SMTP is the same the router task that handles Notes routing. When a message in MAIL.BOX requires transfer to another server, the router determines where to send it and whether to send it over Notes routing or over SMTP.

By default, SMTP is disabled. To configure the Domino server to use SMTP to send mail, you must change settings on the Router/SMTP, Basics, tab of the Configuration Settings document (see figure 2). You can configure Lotus Domino to use SMTP when sending mail to destinations either outside or within the local Internet domain.

Figure 2. Configuring the Domino server to use SMTP
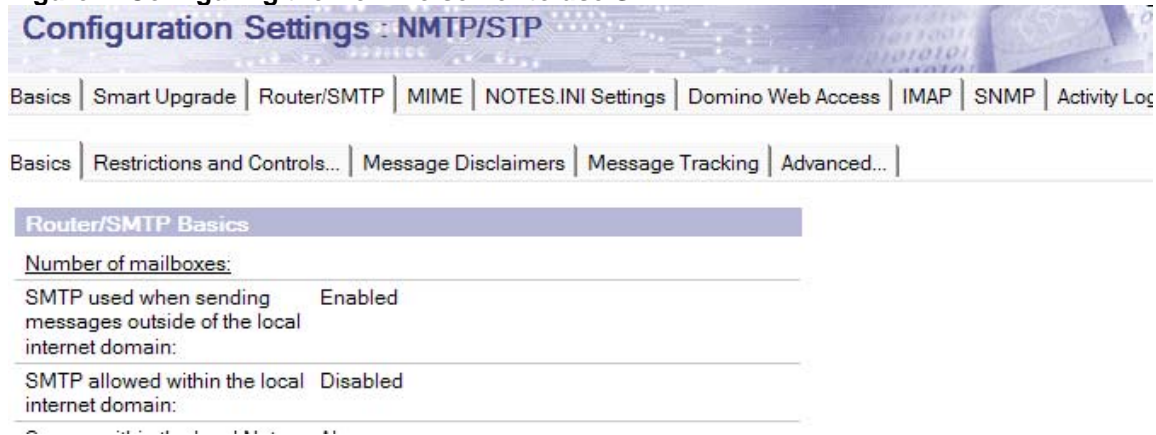
4.2 How the router determines when to use SMTP

On servers that support both SMTP and Notes routing, each time the Router detects a new message in MAIL.BOX, it chooses the protocol by which to transfer the message.

The routing decision is based on the message's address and format, and whether the server is configured to send SMTP within the local Domino domain, or outside the local Internet domain, or both.

Using SMTP to send mail to local Domain addresses

Enabling SMTP within the local Domino domain allows the Router to consider SMTP as an alternative routing protocol when transferring mail to another Domino server in the same Domino domain.

When configuring servers to send SMTP within the local Domino domain, you have the following options:

- **SMTP allowed for MIME messages only.** If the destination is a Domino server running the SMTP listener, and the message deposited in MAIL.BOX is already in MIME format, then the router sends it using SMTP.

  Messages in Notes rich text format are sent over Notes routing.

- **SMTP allowed for all messages.** If the destination is a Domino server running the SMTP listener, then the router always uses SMTP when transferring a message to another Domino SMTP host, regardless of the message's current format.

  If a message deposited in MAIL.BOX is in Notes format, the router converts the messages to MIME before sending.

When the router picks up a message in MAIL.BOX, it reads the address to determine whether the recipient is in the local domain. If the recipient is local, the router looks in the ($Users) view of the Domino Directory for a Person document containing that address.

If SMTP is allowed within the domain, and the message format matches the format specified in this setting, then the router (1) uses TCP/IP to connect to the destination server, (2) establishes an SMTP connection, and (3) transfers the message.

By default, enabling SMTP within the local Domino domain allows the router to use SMTP to transfer mail to any other Domino SMTP host in the same Domino domain.

Note that you can restrict the use of SMTP within the local domain so that SMTP is allowed only for message transfers that take place between servers in the same NNN.

To do this, on the Router/SMTP, Basics, tab of the Configuration Settings document, set the field "Servers within the local Domino domain are reachable via SMTP over TCPIP" to "Always" (see figure 3).

Figure 3. Restricting the use of SMTP within the local domain
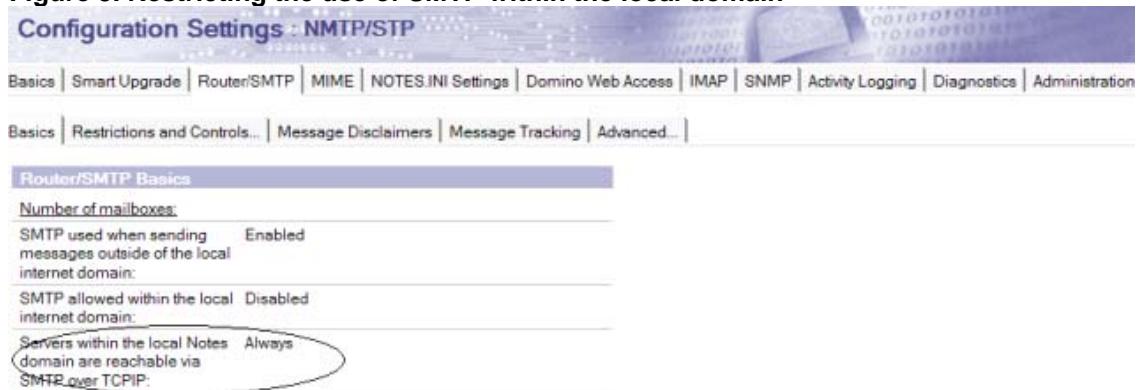
If the receiving server is running the SMTP listener, servers configured to send SMTP within the local Domino domain always use SMTP to send MIME messages to destinations within the same NNN. For messages in Notes format, the router sends via SMTP only if the server is configured to send all messages over SMTP.

Sending SMTP outside the local Internet domain
Enabling Domino to send SMTP to external Internet domains allows the server to transfer outbound Internet mail either directly to a host in the receiving domain or indirectly to an Internet host.

If a message in MAIL.BOX has a recipient address that contains an @ sign and a domain part (the part of the address to the right of the @ sign) that does not resolve to the local Domino domain, the router identifies the message destination as non-local.

A non-local address can be an RFC 821 Internet address (in which the domain part contains a period and is in the form localpart@org.domain) or an address in another Domino domain (including Foreign domains such as a pager or fax gateway).

To determine whether an Internet address is local, the router checks whether the domain part of the address matches any of the local Internet domains defined in the Global Domain document in the Domino Directory. Local Internet domains include any domains listed in the Local primary Internet domain and Alternate Internet domain aliases fields in the Global Domain document.

If there is no Global Domain document, the router compares the domain in the recipient's address to the server's host name. For example, if the message is addressed to jdoe@mailhost3.acme.com and the router is on the server mailhub.acme.com, the router knows that the recipient is in the local Internet domain.

Connecting the Domino mail system to the Internet

Because Lotus Domino routes mail using the Internet-standard SMTP routing protocol, it's easy to configure the Domino system to send and receive mail from external Internet domains.

For outgoing mail, you can use a gateway routing architecture in which only designated servers use SMTP to route mail to external domains, or you can enable all mail servers to use SMTP to route mail to external domains.
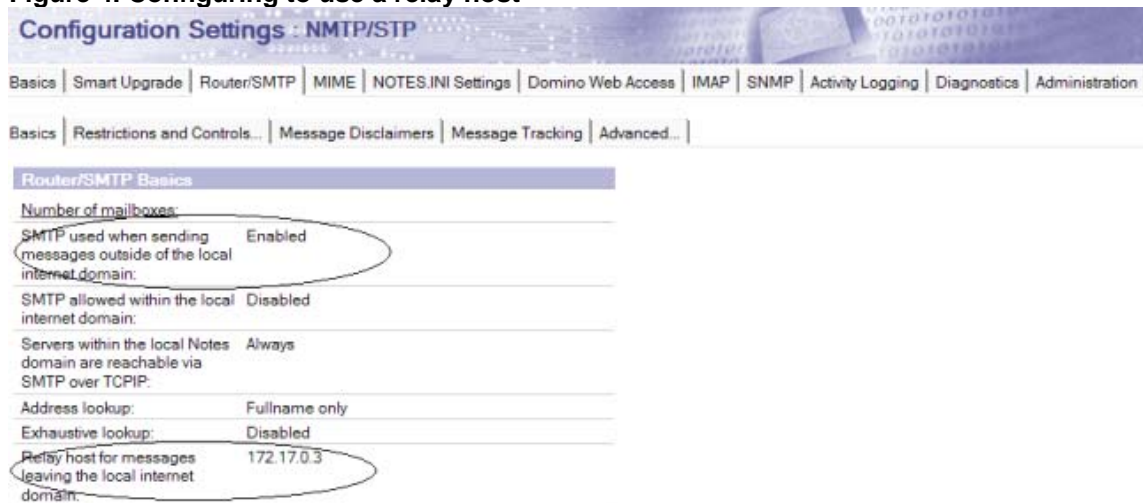
For inbound mail, you need to decide how to route mail coming in to your Internet domain from a firewall to Domino servers. How you set up inbound mail depends on whether your organization uses a single Internet domain name or multiple names, and on the distribution of your servers.

Using a relay host

A relay host is an SMTP server or firewall that connects to the Internet and forwards, or relays, inbound or outbound Internet mail. A relay host can also be a DNS name that maps to multiple MX records.

To configure Domino to use a relay host, you use two fields on the Configuration Settings document of the sending server (see figure 4). Specifically, add the relay's DNS or host name to the "Relay host for messages leaving the local Internet domain" field and enable the field "SMTP used when sending messages outside of the local Internet domain."

Figure 4. Configuring to use a relay host

Using Notes routing to transfer outbound Internet mail to an SMTP server
On internal Domino servers that do not use SMTP to route mail, Lotus Domino uses
Notes routing to transfer outbound Internet messages to a Domino SMTP server, which
then transfers the messages to the Internet, either directly or through a relay host.

To configure servers that use Notes routing to transfer Internet mail to a Domino SMTP
server, you must use a Foreign SMTP Domain document and an SMTP Connection
document.

5 Common issues and troubleshooting tips

Now that you have an idea of how NRPC and SMTP mail routing works in Lotus
Domino, we can move forward to understand on how to troubleshoot some common
issues.

5.1 Internal mail routing not working

If mail is not being:

- Delivered from Mail.box to the mail file, go to Step 1.

- Transferred to another server's Mail.box, go to Step 2.

1. Gather the Delivery Failure Report (DFR) and any relevant errors seen in the console
   log or Log.nsf. If the delivery failure indicates (else, go to Step 3):

   a. The quota is full, get the mail file below quota or increase the quota of mail file.
      [Done]
   b. There is Mailbox corruption, shut down the server and recreate the mail.box [Done].
   c. "File does not exist," check the mail file. [Done]
   d. "User not found in name and address book," there might be a newly registered user
      whose Person document may not yet have replicated or, if the document is
      replicated, then the index might not have updated. In this case, update the index of
      $User view by loading the *updall names.nsf –t "$User"* command.
      If the delivery failure occurs for an older user, then their Person document might be
      corrupted, in which case delete the same and copy from the backup. [Done]
   e. Any denial due to policy reasons, check the Configuration document for any
      restriction specified. Also, check if there are any rules specified in the server's
      Configuration document. [Done]

2. Check the Mail.box for any messages that are dead or held, and determine whether
   disabling the antivirus software resolves the issue. [Done]

3. Gather the Delivery Failure Report and any relevant errors seen in the console log or
   log.nsf. If the delivery failure indicates (else, go to Step 4):

   a. "No router found to server," check the Connection document of the server. Done]
   b. Mailbox corruption, shut down the server and recreate the Mail.box of the destination
      server. [Done]
   c. "Server is not a known TCPIP host," check the DNS server. Ping with server name to
      check if the server name is being resolved. [Done]

4. Issue the command "tell router show" on server console:

   a. If you get a "server not responding" error, check the connectivity to server.
   b. If connectivity is fine, verify that the server is up.
   c. If server is up, check if you are able to Telnet to server on port 1352.
   d. If unable to Telnet to server on port 1352, the port might be blocked in the firewall.
   e. If the output shows a "Busy" state, check whether you are able to transfer data to the destination server by other means (copying small file or ftp'ing small file). Also check whether disabling the antivirus resolves the issue of mail routing.

5.2 Mail is not routing to the Internet but internal mail works fine

If you are receiving:

- A dialog pop-up error when clicking Send on your client, go to Step 1.
- A Delivery Failure Report, go to Step 2.
- No failures, but the Internet recipient never gets the message, go to Step 3.

1. Begin the Notes Client troubleshooting script:

   a) Check whether client is able to ping to the server; if not, check the network setting on the operating system. Go to "b".
   b) Check whether you can trace to the server from Notes client; if not, check that the server is up and running. (Also confirm that port 1352 is open for the server.) Go to "c."
   c) Check whether you able to open the mail file; if not, search for the error message on the Lotus Support Web site. If not found or still unresolved, call Technical Support. [DONE]

2. Search the Lotus Support Web site for DFR dynamically; if not found or still unresolved, call Technical Support. [DONE]

3. Open the Mail.box file on the Domino server. If you:

   - See your message with a red circle icon beside it, go to Step 4.
   - See your message with a red "!" beside it, go to Step 5.
   - See your message sitting there with no icons, go to Step 6.
   - Do not see my message, go to Step 7.

4. **Message is in a DEAD state.** A message will be in a DEAD state if it cannot be routed forward or backward. The intended recipient of the original message (your domain) is unreachable. The Delivery Failure Report back to the sender also fails. This is typically seen with spoofed sender addresses (SPAM). [DONE]

5. **Message is in a HOLD state.** There are only three reasons why a message can be held:

   - Lotus Domino is configured to Hold Undeliverable Mail (enabled in the Configuration Settings document under the Router/SMTP, Advanced, Controls tab, in the section "Restrict name lookups to primary directory only"). [DONE]

- There is a Server Mail Rule configured to "Hold" messages (enabled in Configuration settings document under the Router/SMTP, Restrictions and Controls, Rules tab). [DONE]

- Third-party products, particularly Anti-Virus software, are the most common reason for held mail. [DONE]

6. **Message is PENDING.** Issue a "tell router show" command at the server console. If it indicates that your message destination is:

   - In a state of WAIT, go to Step 8.
   - In a state of BUSY, go to Step 9.
   - In a state of RETRY, go to Step 10.

   If you do not see your message destination, go to Step 9.

7. Check the Console log or Mail Routing Events view in the Log.nsf to see whether your message was transferred to the next hop:

   - If the next hop is Domino, go back to Step 3.
   - If the next hop is non-Domino, then Lotus Domino did its job, and the issue is non-Domino. [DONE]
   - If you do not see the message in the log, call Lotus Support. [DONE]

8. A message can be in a WAIT state for two reasons:

   - It is tagged "low priority" and is waiting for the low-priority-routing time range. [DONE]
   - Connection document setting shows "Route at once if X messages pending" and the threshold of X has not yet been reached. [DONE]

9. Issue a *show tasks* command at the server console. If you see:

   - One router thread that says IDLE, call Lotus Support. [DONE]
   - All router threads in a state of "Connecting to ..." or "Transferring to ...", this could mean the server is simply under high load and mail is backing up waiting for transfer threads to free up from other transfers. [DONE]
   - One router thread that says DISPATCHING, go to Step 11.

10. Check the Column title "Reason of last error". If it says:

    - "Server not responding," go to Step 12.
    - "Remote system not a known TCPIP host," go to Step 13.
    - "No error," call Lotus Support. [DONE]
    - "400 SMTP Protocol Returned a Transient Error," it's typically network or destination server related. [DONE]

    If none of the above, call Lotus Support [DONE]

11. If you see one router thread that says DISPATCHING, the issue is likely DNS related. Make sure that **all** NameServer keys in the Microsoft® Windows® Registry are populated correctly:

   a) Launch the Registry (Start > Run, and type REGEDIT).

   b) Look for the Registry key identified as: \HKEY_LOCAL_MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES\TCPIP\PARAMATERS\INTERFACES.

   c) Confirm that the "NameServer" string contains the correct IP address for DNS purposes; if it does not contain the IP address, enter it in that field and then restart the Domino router. [DONE]

   d) Try using DNSServer=<1.2.3.4> (where 1.2.3.4 represents your DNS server's IP address) in the Notes.ini file so that Lotus Domino bypasses the OS and queries DNS directly. [DONE]

12. Use Telnet to test connectivity to Remote server on port 25 (if SMTP) and 1352 (if NRPC):

   - If unable to connect, it's likely a network or firewall problem. [DONE]
   - If able to connect, it could be that Lotus Domino was given a wrong value by DNS in resolving the destination server (go back to Step 11).

13. The "Remote system not a known TCPIP host," error means that DNS is unable to resolve the hostname to an IP address (go back to Step 11).

5.3 Problems with inbound SMTP mail

If you are:

- Unable to receive SMTP mail from **all** Internet domains, go to Step 1.
- Able to receive SMTP mail from some Internet domains or addresses but not others, go to Step 2.

1. Issue a *show tasks* command at the Domino console; if you:

   a. See "SMTP Server: Listening for requests on port 25," go to Step 3.
   b. Do not see "SMTP Server," go to Step 4.
   c. See "SMTP Server" listening for requests on a different port than 25, go to Step 5.

2. Gather the DFR and any relevant errors seen in the console log or Log.nsf. Call Lotus Support. [DONE]

3. Verify an MX record exists in DNS for your Internet Domain. (There are Web sites can be used to help with this, for example, *www.dnsstuff.com.)* If an MX record:

   a. Does not exist, contact your DNS Admin or ISP to obtain an MX record. [DONE]
   b. Exists and points to a non-Domino server, go to Step 6.
   c. Exists and points to a Domino server, go to Step 7.

4. Go to the Basics tab of the Server document and locate the field "SMTP Listener Task". Verify it is set to ENABLED and then issue a *load smtp* command at the server console (see Step 1).

5. Third-party software may be configured to listen on port 25 and then transfer mail to Lotus Domino over another port (usually 26). Check whether you are running a third-party SMTP listener on port 25:

    a. If Yes, contact vendor support for further troubleshooting as all inbound SMTP will be first directed to port 25. [DONE]
    b. If No, reset the Domino Inbound SMTP port back to '25' in the Server document, Ports, Internet Ports, Mail tab (see Step 1).

6. A non-Domino gateway sits between the outside world and the Domino environment:

    a. Contact vendor support for non-Domino server to troubleshoot *why* it cannot receive SMTP mail. [DONE]
    b. The gateway is receiving SMTP mail but unable to transfer to Domino, in which case go to Step 7.

7. Use Telnet to test connectivity to Lotus Domino over port 25 from *outside* the firewall. To do this, find a workstation outside the firewall; if it's a Windows platform, open a command prompt and type "telnet <MX_hostname_or_IPaddress> 25". Figure 5 shows successful connectivity to a Domino server (notice that the version is displayed).
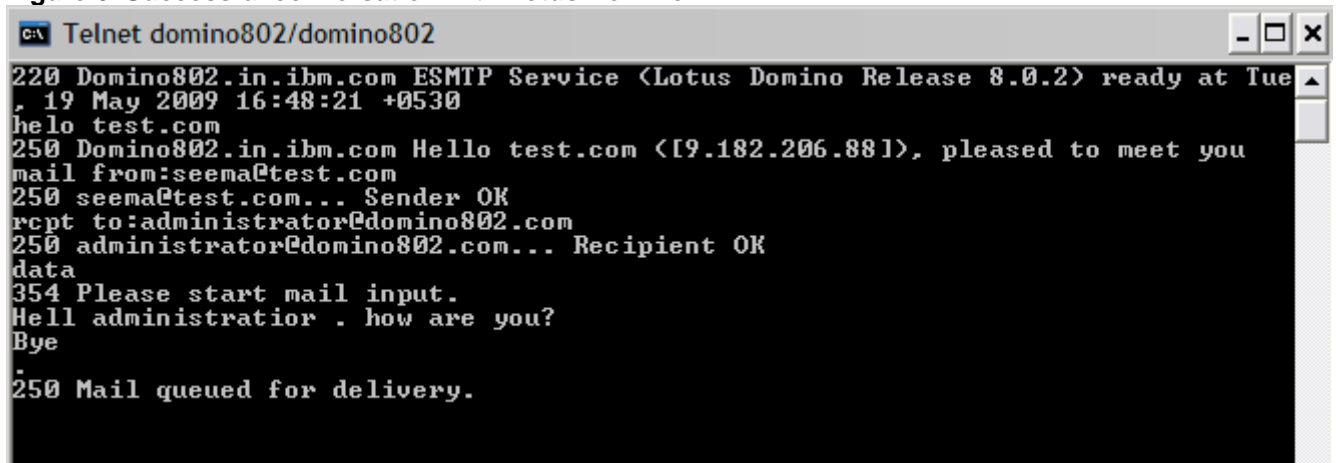
Figure 5. Successful connectivity
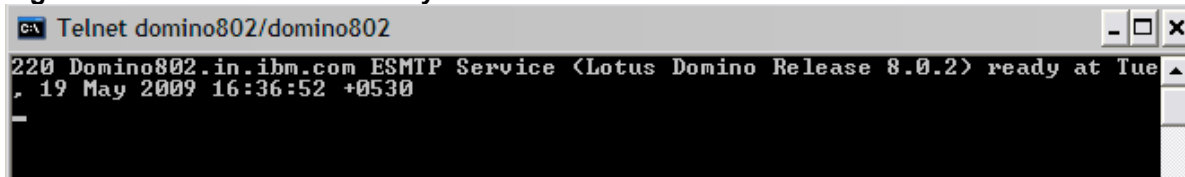
    If Telnet connectivity:

    a. Is successful, but you get a 220 Domino banner, go to Step 8.
    b. Is successful, but you get a non-Domino banner, go back to Step 5.
    c. Fails, go to Step 9.

8. Step through a complete SMTP conversation via Telnet. Figure 6 illustrates a successful SMTP conversation with a Domino server. For assistance regarding this step, call Lotus Support.

Figure 6. Successful conversation with Lotus Domino


```
Telnet domino802/domino802                                    _ □ ×

220 Domino802.in.ibm.com ESMTP Service (Lotus Domino Release 8.0.2) ready at Tue
, 19 May 2009 16:48:21 +0530
helo test.com
250 Domino802.in.ibm.com Hello test.com ([9.182.206.88]), pleased to meet you
mail from:seema@test.com
250 seema@test.com... Sender OK
rcpt to:administrator@domino802.com
250 administrator@domino802.com... Recipient OK
data
354 Please start mail input.
Hell administratior . how are you?
Bye
.
250 Mail queued for delivery.
```

If the SMTP conversation over Telnet:

    a. Was successful, the message was accepted for delivery, and the recipient has received the message in the mail file, then Lotus Domino is working as expected and can accept SMTP mail. [DONE]

    b. Appears to be successful, and the Domino server claims the message was accepted for delivery, but the recipient never got the message in the mail file, go back to Step 3 of Section 5.1.

    c. Fails and you get a 4XX or 5XX error message during the exchange of commands, gather the error message and call Lotus Support. [DONE]

9. Find a workstation *inside* the firewall and repeat the same Telnet connectivity test:

    a. If Telnet connectivity is successful, the inbound SMTP problem is likely caused by the firewall blocking inbound traffic over port 25. [DONE]

    b. If Telnet connectivity fails, go to Step 10.

10. Telnet directly from the physical server to itself. If Lotus Domino is running on a Windows platform, type "telnet localhost 25" at the command prompt:

    a. If Telnet connectivity is successful, go to Step 8.

    b. If Telnet connectivity fails, call Lotus Support. [DONE]

5.4 Internet users get a DFR when replying to your mail

In this scenario, the issue is due to incorrect syntax of the Internet address. A typical example of an incorrect reply address is joe.user/org%domain@domain.com. The intended correct syntax is joe.user@domain.com.

1. Open the Location document in the Notes Client Personal Address Book under the Advanced > Locations view. The most commonly used Location document is titled "Office". If your Internet Address field:

    a. Is blank, go to Step 2.

    b. Shows an incorrect value, change it to a correct value. [DONE]

    c. Shows the correct value, go to Step 3.

2. It may be the intention of the Domino Administrator to leave this field blank, to restrict users' ability to modify their Internet address and to allow address lookups to be performed centrally on the server's Domino Directory:

    a. If it is **not** the intention to leave this field blank, populate it with the desired Internet address. [DONE]
    b. If it **is** the intention to leave this field blank, go to Step 4.

3. Open your Sent folder and right-click on a recent message to an Internet recipient. Go to Document Properties, click the Fields tab (second tab), and look for the field iNetFrom:

    a. If you don't see this field, **or** the field shows an incorrect value, go to Step 5.
    b. If you do see the field and it has a value equal to the Internet Address field in the Location document, call Lotus Support if the problem persists. [DONE]

4. Open the Global Domain document in the Domino Directory, Configuration folder, Messaging, Domains view. Verify that the Notes Domain is properly listed in the Restrictions tab and then look at the Conversions tab. If the "Internet Address Lookup" field:

    a. Is ENABLED, go to Step 6.
    b. Is DISABLED, go to Step 7.

5. You likely have a corrupt Location document. Create a brand new Location document, populating the necessary values compared against the old Location document. Then delete the old Location document and send another test message to the Internet (see step 3).

6. Locate and open the Person document of the Sender. If the Internet Address field is

    a. Blank, then populate the field with the desired value. [DONE]
    b. Blank and this is the intention of the Domino Admin, go to Step 7.
    c. Populated correctly, call Lotus Support. [DONE]

7. Go back to the Conversions tab of the Global Domain document. Verify the field "Local part formed from:" is set to "Common Name", to ensure the local part (on the left of the @ sign) will be formed with "joe.user" instead of "joe.user/org".   Then verify the field "Domino Domains Included" is set to "None", to ensure the "%domain" does not get added to the Internet address. [DONE]

5.5 Problems receiving mail via POP3 or IMAP

If you have a problem when:

- retrieving mail over POP3, go to Step 1.
- fetching mail over IMAP, go to Step 9.

1. If your POP3 Client:

a. cannot connect to Lotus Domino, go to Step 2.
b. can connect but fails to authenticate, go to Step 3.
c. can authenticate but cannot receive mail, go to Step 4.

2. Issue a *show tasks* command on the Domino console and look for POP3 Server listening for request on 110. If you:

a. See the task listening on port 110, go to Step 5.
b. Do not see the POP3 Server task listening, go to Step 6.

3. Verify the user has an Internet password specified in the Person document. This is the POP3 password used for authentication. The User Name depends on the following Server document setting on the Security tab:

Internet Access

Internet authentication: More name variations with lower security

a. If this field is set to *More name variations with lower security*, the User Name that should be used for authentication can match the shortname, lastname, common name, or Internet address in the user's Person document.

b. If this field is set to *Fewer name variations with higher security,* the User Name that should be used for authentication can match the Internet address or common name in the user's Person document (see Step 8).

4. Collect any error messages seen on the POP3 Client or Domino server console/logs. If you cannot fine the error(s) on the Lotus Support Web site, call Lotus Support. [DONE]

5. Use Telnet to test connectivity to Domino over port 110 from the same workstation on which the POP3 Client is installed. If it is a Windows platform, open a command prompt and type "telnet <MX_hostname_or_IPaddress> 110".

a. If Telnet connectivity is successful, you get a OK Domino banner (go to Step 7),
b. If Telnet connectivity fails, repeat the same Telnet test from inside the firewall. If it's successful, the problem is likely related to the firewall blocking connectivity to port 110 for external users. [DONE]

6. Verify that POP3 port 110 is enabled in the Server document, Ports tab, Internet Ports, Mail tab. This port should be enabled by default. Once confirmed, issue a *load pop3* command at the console.

a. If Port 110 is disabled, enable it for the first time (see Step 2).
b. If Port 110 was already enabled, call Lotus Support. [DONE]

7. Confirm the POP3 Client is configured to use 110 as the POP3 port. Also try using the IP address (same as used for Telnet) in the POP3 Server Name field. If DNS cannot resolve the host name of the POP3 server, connectivity will fail. [DONE]

8. Use Telnet to test POP3 authentication. From a command prompt, connect to the Domino server over port 110. After receiving the OK Domino banner, type:

> User *username* <enter>
> Pass *password* <enter>

   a. If you get "OK *username* has X messages", authentication is successful. Apply the same credentials to the POP3 client. [DONE]
   b. If you get "-ERR Error", authentication is failing with these credentials. Reset the Internet password in the Person document and repeat testing authentication over telnet until log-in is successful. [DONE]

9. If the IMAP Client:

   a. cannot connect to Lotus Domino, go to Step 10.
   b. can connect but fails to authenticate, go to Step 11.
   c. can authenticate but cannot fetch mail, go to Step 12.

10. Issue a *show tasks* command on the Domino console and look for IMAP Server listening for request on 143. If you:

   a. See the IMAP Server task listening on 143, go to Step 13.
   b. Do not see the IMAP Server task listening, go to Step 14.

11. Verify the user has an Internet password specified in the Person document. This is the IMAP password used for authentication. The User Name will depend on the following Server document setting found in the Security tab:

Internet Access

Internet authentication: More name variations with lower security

   This field is set to *More name variations with lower security,* if the User Name that should be used for authentication can match the shortname, lastname, common name, or Internet address in the user's Person document.

   This field is set to *Fewer name variations with higher security*, if the User Name that should be used for authentication can match the Internet address or common name in the user's Person document (see Step 16).

12. Collect any error messages seen on the IMAP Client or Domino server console/logs. If you cannot find the error(s) on the Lotus Support Web site, call Lotus Support. [DONE]

13. Use Telnet to test connectivity to Domino over port 143 from the same workstation on which the IMAP Client is installed. If it's a Windows platform, open a command prompt and type "telnet <MX_hostname_or_IPaddress> 143". Figure 8 shows successful connectivity to the Domino server.

Figure 8. Successful connectivity

`* OK Domino IMAP4 Server Release 8.0.1 ready Tue, 31 Mar 2009 12:53:10 +0530`
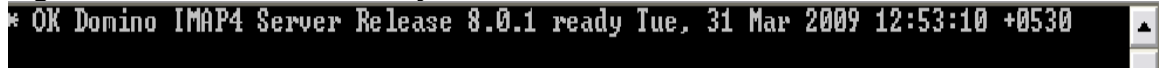
    a. If Telnet connectivity is successful, you get an OK Domino banner (go to Step 15),

    b. If Telnet connectivity fails, repeat the same Telnet test from inside the firewall; if it's successful, the problem is likely related to the firewall blocking connectivity to port 143 for external users. [DONE]

14. Verify that IMAP port 143 is enabled in the Server document, Ports tab, Internet Ports, Mail tab. his port should be enabled by default. Once confirmed, issue a *load imap* command at the console:

    a. If Port 143 is disabled, enable it for the first time (see Step 10).

    b. If Port 143 was already enabled, call Lotus Support [DONE]

15. Confirm the IMAP Client is configured to use 143 as the IMAP port. Also try using the IP address (same as used for Telnet) in the IMAP Server Name field. If DNS cannot resolve the host name of the IMAP server, connectivity will fail. [DONE]

16. Use Telnet to test IMAP authentication. From a command prompt, connect to the Domino server over port 143. After receiving the OK Domino banner, type:

    tag login *username password*

    a. If you get "OK login completed", authentication is successful. Apply the same credentials to the IMAP client. [DONE]

    b. If you get "NO LOGIN invalid user name or password", authentication is failing with these credentials. Reset the Internet password in the Person document, and repeat testing authentication over Telnet until log-in is successful. [DONE]

5.6 Duplicate messages are received by a Notes mail file

If the sender of the duplicate messages:

- is an internal Notes user, go to Step 1.
- resides on the Internet, go to Step 2.

1. Open the Inbox and locate the duplicate messages with a Notes Client. Right-click on the first message and go to "Document Properties". Click on the Fields tab (second tab) and highlight the *PostedDate* field. Make note of the time stamp value as follows: "04/04/2006 07:58:01 AM EDT". Repeat these steps on the duplicate message and compare the values; if the

    a. *PostedDate* values match, go to Step 3.

    b.   *PostedDate* values do not match, go to Step 4.

2. With a Notes Client, locate the duplicate message in the mail file and select View > Show > Page Source. The first set of fields is the RFC822 *Received* fields. Each

Received field represents an SMTP server hop on route from source to destination through which the message traversed. Each server hop is stamped with the time the message was received. Compare the list of *Received* fields with that of the duplicate message:

   a. If one set of *Received* fields does not display identical time stamps, go to Step 10.
   b. If the list of *Received* fields is identical, go back to Step 3.

3. In the Document Properties, Fields tab, locate the *$MessageID* field. Compare the entire value to the $*MessageID* of the duplicate message:

   a. If the $*MessageID* values match, go to Step 5.
   b. If the $*MessageID* values do not match, go to Step 6.

4. If the *PostedDate* field values do not match, the message was composed by the sender's mail client twice. This is not a true duplicate message. Possible reasons for this scenario could be a malfunctioning agent in the sender's mail file or simply the sender's intention to send twice. [DONE]

4. In the Document Properties, Fields tab, locate the *RouteServers* field. Make note of the list of Domino servers through which this message has traversed, as follows:

   "CN=SERVER02/OU=ACME/O=Lotus"
   "CN=SERVER04/OU=ACME/O=Lotus"

   Compare this list to the *RouteServers* list of the duplicate message:

   a. Lists that do not match could be the result of a Domino Directory configuration issue. Call Lotus Support for further analysis. [DONE]
   b. If the RouteServers list matches the duplicate messages, go to Step 7.

6. If the $*MessageID* field values do not match, we are not dealing with true duplicate messages. Possible causes for inconsistent $*MessageIDs* could be third-party intervention with the message (most commonly seen when the antivirus scans messages in Mail.box). Customized agents in Mail.box may also modify the field values of message. NOTE: Customized Mail.box agents are not supported. [DONE]

7. In the Document Properties, Fields tab, locate the *RouteTimes* field and take note of the list of times. These times should line up with the *RouteServers* list; for example:

   RouteServers:
   "CN=SERVER02/OU=ACME/O=Lotus"
   "CN=SERVER04/OU=ACME/O=Lotus"
   RouteTimes:
   04/04/2006 07:58:02 AM - 04/04/2006 07:58:03 AM
   04/04/2006 07:58:03 AM - 04/04/2006 07:58:04 AM

   From the example above, SERVER02 received the message at 7:58:02AM and routed it to SERVER04 at 7:58:03AM. SERVER04 received the message from SERVER02 at 7:58:03AM and delivered it to the mail file at 7:58:04AM.

Comparing these fields with the same fields of the duplicate message allows us to determine which server is responsible for transferring or delivering the duplicate message. Specifically, the *RouteTimes* stamp that does not match with the duplicate message time stamp will correlate to the culprit server.

   a.   If the *RouteTimes* between the duplicate messages are identical, go to Step 8.
   b.   If you've determined the culprit server, go to Step 9.

8.   In the rare circumstance when the *RouteTimes* fields of the duplicate messages match, we can only assume that the message was delivered to the mail file by the router once.

   To confirm this, check Log.nsf (Mail Routing Events view) for the one—and only one—entry stating the message was delivered to the recipient. Once confirmed, we can deduce the cause of the duplication to be a copy agent or rule in the recipient's mail file. [DONE]

9.   Often times, third-party antivirus software will change the message *RoutingState* to a value other than *Pending*, rendering it un-routable during a scan. Another possible method for message scan is to move the message into a temporary location such as a quarantine database.

   When the scan has completed, it is the responsibility of the antivirus program to return the message to Mail.box in a *Pending* state. If, however, there's a malfunction with the antivirus, causing the message to be placed into Mail.box multiple times, duplicate messages will occur.

   Currently, the only known Domino server bug that could result in duplicate messages is documented in SPR# **PAZR6LM4UT**. Note that conditions of heavy routing load combined with a router restart are necessary for this issue to arise. [DONE]

10. Locate the mismatched *Received* field. The SMTP server listed in the **previous** *Received* field is responsible for the duplicate message. If the very first *Received* field is mismatched, then the message was sent twice by the sender. If the culprit server is:

   a.   non-Lotus Domino, contact vendor technical support. [DONE]
   b.   Lotus Domino, go back to Step 9.

5.7 Mail being delivered to the wrong recipient

If mail is being delivered to the wrong person, check the:

1.   Person document of the recipient (see Step 3).
2.   Configuration document, Router/SMTP tab, Basics tab (see Step 4).
3.   Mail file name for the recipient; if it's wrong, correct the same. [DONE]
4.   Address lookup field; if it's set to "Fullname then local part", change it to "Fullname only" (see figure 9). Also, make sure this setting is done on the first server that receives the mail (Incoming SMTP server).
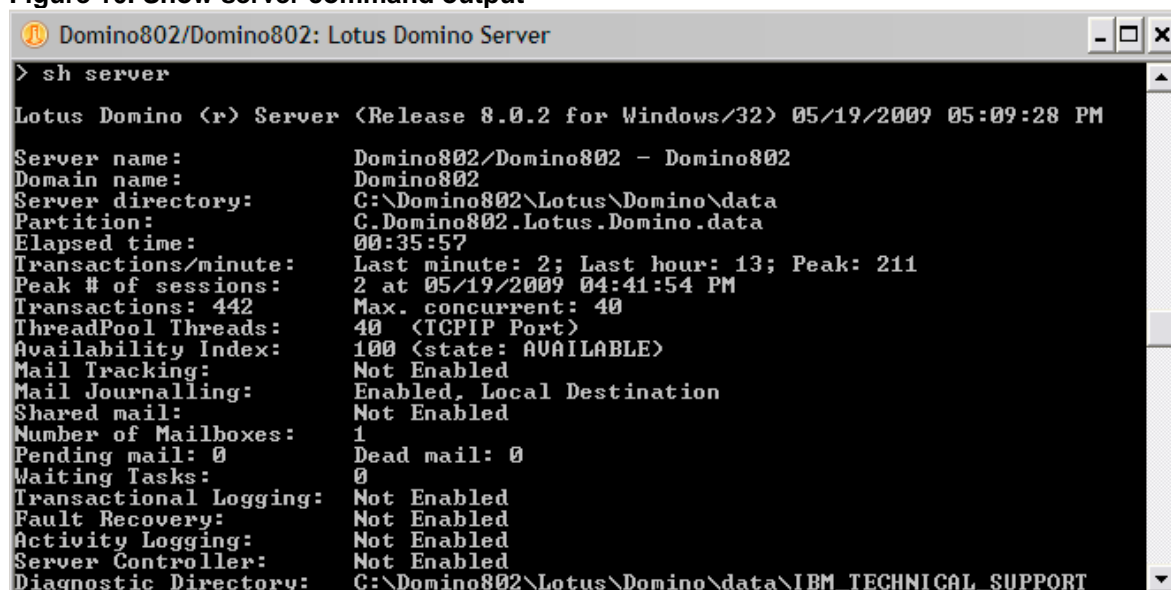
Figure 9. Address lookup field
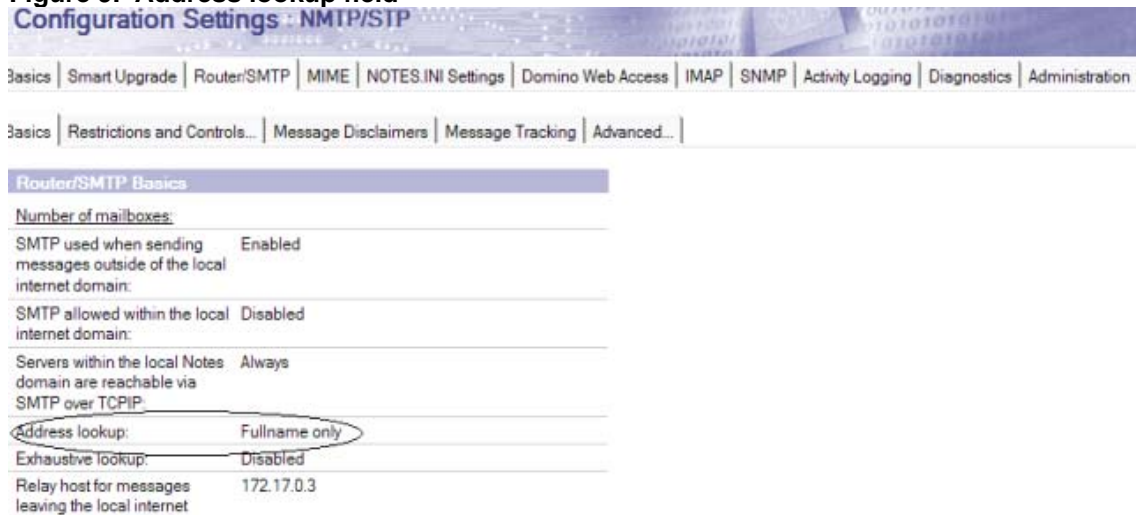
6 Key troubleshooting commands

Server commands that can help gather data for troubleshooting mail-routing issues are:

1 Show Server
2 Tell Router Show Queue
3 Show Task
4 Show Task Time
5 Show Stat Mail
6 Route
7 Trace

An example of the output for the ***show server*** command is shown in figure 10.

Figure 10. Show server command output

Here's an example of the *Tell Router Show Queue* command output:

```
Msgs State  Via Destination
57 Busy(18) NRPC [$LocalDelivery]
24 Retry( 4) NRPC  CN=MesungUS/O=Sun (Push)
    Last error: Server not responding
    Next retry: 1/04/2009 09:53:09 AM
Transfer Threads: Max = 18; Total = 14; Inactive = 0; Max
Concurrent = 9
Delivery Threads: Max = 18; Total = 18; Inactive = 0
```

For more information, refer to the Lotus Software Knowledge Base document #1093506, "How to Read the Output of TELL ROUTER SHOW Command"

Figure 11 shows example output for the *Show Tasks* command.

Figure 11. Show Tasks output

The following example output is for the *Show Tasks Time* command:

```
Database Server      Process Monitor: [04/02/2009 15:51:05 ZE5B]
 SMTP Server         Listen for connect requests on TCP Port:25
: [04/02/2009 15:50:35 ZE5B]
 SMTP Server         Utility task: [04/02/2009 15:50:35 ZE5B]
 IMAP Server         Listen for connect requests on TCP Port:143
```

```
: [04/02/2009 15:50:35 ZE5B]
 IMAP Server          Utility task: [04/02/2009 15:50:35 ZE5B]
 POP3 Server          Listen for connect requests on TCP Port:110
: [04/02/2009 15:50:35 ZE5B]
 POP3 Server          Utility task: [04/02/2009 15:50:35 ZE5B]
 Process Monitor      Idle: [04/02/2009 15:50:50 ZE5B]
 Agent Manager        Executive '1': Idle: [04/02/2009 15:50:50
ZE5B]
 Calendar Connector   Idle: [04/02/2009 15:50:35 ZE5B]
 SMTP Server          Control task: [04/02/2009 15:50:50 ZE5B]
 Rooms and Resources  Idle: [04/02/2009 15:50:50 ZE5B]
 IMAP Server          Control task: [04/02/2009 15:50:50 ZE5B]
 Schedule Manager     Idle: [04/02/2009 15:50:50 ZE5B]
```

Figure 12 shows example output for the **Show Stat Mail** command:

Figure 12. Show Stat Mail output

Example **Route** commands:

>**Route Marketing/Acme**
Sends mail to the Marketing server in the Acme domain. The server console displays
messages indicating when routing begins.

>**Route ***
Sends mail to all pending destinations.

>**Route [$LocalDelivery]**
Overrides the next scheduled retry time and attempts local delivery immediately.

Example **Trace** command:

Trace Ryan/Lotus

```
Determining path to server Marketing/Acme
Available Ports: TCPIP
Checking normal priority connection documents only...
Allowing wild card connection documents...
Enabling name service requests and probes...
Address found in local TCPIP names table for Marketing/Acme
Connecting to Marketing/Acme over TCPIP
Using address 'x.xx.xxx.xxx' for Marketing/Acme on TCPIP
Connected to server Marketing/Acme
```

7 Debugs for collecting further troubleshooting data

For issues with internal mail delivery and transfer, and sending mail to the Internet over SMTP, use the following debugs:

- DebugRouter
- Log_MailRouting
- DebugRouterLookup

Table 1 shows the values and logs for DebugRouter.

Table 1. Values for DebugRouter

Value	Logs
DebugRouter=1	• mail routing filters which show whether messages are ready to be routed • addition and deletion of recipient names from routing queues
DebugRouter=2	• routing tables • least cost path calculation
DebugRouter=3	• verbose information, which is the combination of levels 1 and 2

The output of DebugRouter=3 is the cumulative output of both 1 and 2:

DebugRouter=3

Domain *.* added
Server CN=MARKETING/O=ACME added to server table, tasks = 0001.
Server CN=SALES/O=ACME added to server table, tasks = 0001.
Connection from CN=MARKETING/O=ACME to CN=SALES/O=ACME has a Cost= 1
Connection from CN=SALES/O=ACME to CN=MARKETING/O=ACME has a Cost= 1
Sorted Domains follow:
    Wildcard SMTP Domain='*.*', NextDomain='THEINTERNET'
Rule table is 1 segments (0 bytes)
Sorted Rules follow:

Sorted Connections follow: (Source -> Destination)
        'CN=MARKETING/O=ACME'@'LOTUS' ->
'CN=SALES/O=ACME'@'LOTUS'
        'CN=SALES/O=ACME'@'LOTUS' -> 'CN=MARKETING/O=ACME'@'LOTUS'

Table 2 shows the values and logs for Log_MailRouting.

Table 2. Values for Log_MailRouting

Logging Level	Information Logged
Minimal Log_MailRouting=10	• All mandatory status messages and fatal error messages (for example, startup and shutdown, mail database compaction, etc.) • Successful deliveries and transfers are not recorded
Normal Log_MailRouting=20	• All messages in Minimal logging level • Also logs all warning messages indicating conditions that do not cause processing to stop

Informational
 	
Log_MailRouting=30
	• All messages at Minimal and Normal levels
	
	• Also logs all informational messages involving:
	  • Intermediate storage
	  • MAIL.BOX access
	  • Message handling (including thread information)
	  • Message conversion
	  • Transport status

Logging Level	Information Logged

Verbose
 	
Log_MailRouting=40
	• Includes Minimal.Normal, and Informational messages
	
	• Additional messages that may help you troubleshoot system problems including:
	  • Successful transfers and deliveries
	  • Message queues and full document information for Mail.Box
	  • The full hierarchical names of senders and recipients
	  • The UNID of each message; and creation, usage, idling, and shutdown of routing threads
	
	Note: Enable the Verbose setting only during troubleshooting. Verbose logging taxes server resources and causes the log file to increase dramatically in size.

The output of Log_MailRouting=40 is the cumulative output of 10, 20 and 30:

Log_MailRouting=40

01/04/2009 05:40:21 PM Router: Searching for messages since 01/04/2009 05:39:55 PM
01/04/2009 05:40:21 PM Router: Message <PoolNum:Block> 1:1388 has 1 recipients, priority = 1
01/04/2009 05:40:21 PM Router: Note NT00000D02 in mailbox 1 from'CN=Admin

User/O=ACME'
01/04/2009 05:40:21 PM Router: Recipient 0 = 'CN=Admin User/O=ACME@Lotus'
01/04/2009 05:40:21 PM Router: Recipient 0 Username = 'CN=AdminUser/O=ACME'
Domain = 'Lotus'
01/04/2009 05:40:21 PM Router: Message <PoolNum:Block> 1:1388 adding recipient
Admin User/Lotus@Lotus (mail\auser.nsf) to the Local Delivery queue

01/04/2009 05:40:21 PM Router: Message 007C88FD delivered to Admin User/Lotus
from Admin User/Lotus OFB519EB71:FC2D0599 ON85256FA1:007C88FD Size: 1K
Time: 00:00:01 Hop Count: 1

01/04/2009 05:40:26 PM Router: Deleting delivery queue [$LocalDelivery]
01/04/2009 05:40:26 PM Router: Deleting delivery recipient descriptor for CN=Admin
User/O=ACME

Table 3 shows the values and logs for DebugRouterLookup.

Table 3. Values for DebugRouterLookup

Logging Level	Information Logged
DebugRouterLookup=0	• Disable logging
DebugRouterLookup=3	• Enable logging • Display how the Router task resolves a name lookup

DebugRouterLookup=3 [Bogus User]

01/04/2009 05:07:50 PM DebugRLookup: Lookup beginning for user:bogus.user name:
bogus.user@sun.com

01/04/2009 05:07:50 PM DebugRLookup: Lookup beginning for user:bogus.user name:
bogus.user

01/04/2009 05:07:50 PM DebugRLookup: Lookup error: UserName: bogus.user Error:
User %a not listed in Domino Directory

DebugRouterLookup=3 [Valid User]

02/07/2005 11:52:13 AM DebugRLookup: Lookup beginning for user:test name: test
02/07/2005 11:52:14 AM DebugRLookup: Lookup beginning for user:test name: test
02/07/2005 11:52:14 AM DebugRLookup: Lookup result has [2] matches. user: test name: test
02/07/2005 11:52:14 AM DebugRLookup: Lookup multiple match 2 Fullname[1] = CN=Test User/O=Lotus
02/07/2005 11:52:14 AM DebugRLookup: Lookup multiple match 1 Fullname[1] = CN=Test User/O=IBM/C=IN
02/07/2005 11:52:14 AM DebugRLookup: Lookup multiple match 1 Fullname[2] = Test User
02/07/2005 11:52:14 AM DebugRLookup: Lookup Error: Non unique matches for user:Test name: Test

8 Notes.ini variables for debug

Below is a list of Notes.ini variables that can be set to debug SMTP routing issues on a Domino server, excerpted from the Lotus Support Techdoc #:7003007, "Domino Router notes.ini debug parameters for SMTP".

Important Note: The SMTPClientDebug parameter does not require the use of the Notes.ini parameter debug_outfile. All information will be written to the Miscellaneous section of Log.nsf. However, SMTPDebug and SMTPDebugIO do not write their outfile to the LOG.NSF and need to use the following parameter:

        debug_outfile=path/filename.txt

SMTPClientDebug. Captures the outgoing SMTP protocol conversations. This is for all messages transferred by the router to other servers (Domino or otherwise) via the SMTP protocol. Note that this does not include the message content, just the higher-level protocol commands and responses:

    1 - Enable capture of outbound SMTP message transfer protocol.

SMTPDebug. Captures inbound SMTP protocol conversations. This is for all messages received by the SMTP listener from all clients and servers via the SMTP protocol:

    1 - Enable minimal logging of the SMTP listener
    2 - Enable information logging of data sent and received along with some additional debugging information. This setting indicates commands and responses being received/sent along with the number of bytes being transmitted, but it does not include the text that is transmitted.
    3 - Enable verbose logging of data sent and received. Along with the information recorded at setting 2, this level shows the actual text received/sent via SMTP. Note that this does not include the text body of messages.
    4 - This is the most verbose you will get for logging (note that this is an undocumented value; the documentation only lists up to "3").

SMTPDebugIO. Enables the logging of all data received by the SMTP listener task:

0 - No logging
1 - Number of bytes sent and received during the SMTP conversation
3 - Logs all data received by the SMTP task
4 - RFC822 data (message data)

Syntax: SMTPDebugIO=*value*
Caution: Use SMTPDebugIO only when necessary and disable it again as soon as possible. It can cause the log file to grow very large, and logs the contents of received messages.
Applies to: SMTP servers
Default: 0
UI equivalent: None

Figure 13 shows an example of SMTPDebugIO=4 output.

Figure 13. Example output for smtpdebugio=4


```
R:  Hi Jerry,
05/24/2006 01:32:00.00 PM [02F4:0008-0AC0] SMTP CITask StateMachine> ITASK_STATE
_RECV_TEXT: Received 0 bytes from 9.33.9.11

05/24/2006 01:32:00.00 PM [02F4:0008-0AC0] SMTP CITask StateMachine> ITASK_STATE
_RECV_TEXT: Received 75 bytes from 9.33.9.11

[02F4:0008-0AC0]
R:  I was just wondering what you were doing on Memorial Day weekend ?  George
05/24/2006 01:32:00.00 PM [02F4:0008-0AC0] SMTP CITask StateMachine> ITASK_STATE
_RECV_TEXT: Received 75 bytes from 9.33.9.11

[02F4:0008-0AC0]
R:   and I are heading over to Elaine's for a BBQ. You are more than welcome to
05/24/2006 01:32:00.01 PM [02F4:0008-0AC0] SMTP CITask StateMachine> ITASK_STATE
_RECV_TEXT: Received 8 bytes from 9.33.9.11

[02F4:0008-0AC0]
R:   join us.
05/24/2006 01:32:00.01 PM [02F4:0008-0AC0] SMTP CITask StateMachine> ITASK_STATE
_RECV_TEXT: Received 0 bytes from 9.33.9.11
```

SMTPSaveImportErrors. Enables the SMTP listener to save the message context exactly as it is received. The message is written to a file in the system Temp directory with a name STXXXXXX.TMP. When a message is saved in the temp file, a line indicating the name of the file will be written to the log. The value of the parameter controls the saving of messages as follows:

1 - Save all messages that fail to import (parse/save in MAIL.BOX). This setting is useful to trap messages that we fail to accept from other SMTP servers sending mail to this server. It is important to note that only message that result in ***import errors*** will be written to a temp file when using this value.
2 - Save all messages that are received at the server.
3 - Save all inbound messages during import, delete all messages that have been successfully received and written into MAIL.BOX. Only messages that fail to be imported into MAIL.BOX will be saved to a temp file.

For more information, refer to the Knowledge Base document #:1095102, How to trap inbound SMTP messages on a Domino server."

To inspect network-related issues in SMTP mail routing we can use these debug parameters:

debug_tcp_resolver=1. Provides samples of "good" and "bad" responses from TCP Resolver during troubleshooting of DNS problems.

debug_tcp_session=1. Displays debug information about sessions opened and closed on TCP/IP.

For more information, refer to the Knowledge Base document #: 1087806, "How should the DEBUG_OUTFILE Parameter Be Implemented?"

9 Conclusion

Customers should now have a good feel for solving mail routing issues on your own, which will help you be self-sufficient and, in turn, reduce the turn-around times for problem resolution. If you're a Support Engineer, hopefully this paper has also helped you resolve mail routing issues and enhanced your understanding of the debug outputs.

10 Resources

developerWorks® Lotus Notes and Domino product page:
http://www.ibm.com/developerworks/lotus/products/notesdomino/?S_TACT=105AGX13&S_CMP=LP

Lotus Domino product information page:
http://www-01.ibm.com/software/lotus/products/domino/

Notes and Domino wiki:
http://www-10.lotus.com/ldd/dominowiki.nsf

Lotus Support Web site:
http://www-01.ibm.com/software/lotus/support/

11 About the authors

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